**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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| Serial No. | : | **10/668,573** |
| Filed | : | September 23, 2003 |
| Applicant | : | Jonathan R. Coppeta, et al. |
| Title | : | Micro-Reservoir Osmotic Release Systems and Microtube Array Device |
| TC/AU | : | 3767 |
| Examiner | : | Elizabeth MacNeill |
| Docket No. | : | 17509-0068 |
| Customer No. | : | 29052 |

## REPLY BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. § 41.41, Appellants submit this Reply Brief in response to the Examiner's Answer mailed March 19, 2008, in Appellant's appeal of the final rejection of claims pending in the referenced application.

## I. Status of Claims

The status indicated in the Examiner Answer and Appeal Brief remain correct: Claims 14-29, 35, 36, and 39-47 are pending and stand finally rejected as set forth in the Office Action mailed July 2, 2007 ("the Final Office Action"). Claims 1-13, 30-34, 37, and 38 are canceled. The rejections of claims 14-29, 35, 36, and 39-47 are being appealed.

## II. Grounds of Rejection to Be Reviewed On Appeal

The following three grounds of rejection are presented for review:

Ground No. 1

Whether a *prima facie* case of anticipation has been established to support a rejection of claims 14-18, 20-29, 35, 36, and 39 over U.S. Patent No. 6,692,456 to Eppstein (hereinafter "Eppstein").

Ground No. 2

Whether a *prima facie* case of obviousness has been established to support a rejection of claims 19 and 42-47 over U.S. Patent No. 7,025,323 to Krulevitch et al. (hereinafter "Krulevitch") in view of U.S. Patent No. 5,797,898 to Santini, Jr. et al. (hereinafter "Santini").

Ground No. 3

Whether a *prima facie* case of obviousness has been established to support a rejection of claims 40 and 41 over Eppstein in view of U.S. Patent No. 4,111,202 to Theeuwes (hereinafter "Theeuwes").

## III. Argument

A. Ground No. 1

The Examiner's interpretation of the claim phrase "positively displacing the release formulation" is wrong. In the Examiner's Answer, the Examiner erroneously argues that the downward modulation of the *entire reservoir* in Eppstein is equivalent to *positively displacing* the release formulation. The Examiner alleges that Appellants' claims do not require either (a) that the space occupied by the fluid in the reservoir be eliminated or (b) that the fluid be pushed out by another material. The Examiner's reading of the claims is plainly inconsistent with the ordinary, well understood meaning of "positive displacement." One of ordinary skill knows that (1) the "displacement" of a substance from a vessel requires movement of the substance to a place outside the vessel, and (2) that the modifying term "positive" specifies that the space in the vessel formerly occupied by the original substance has been eliminated or replaced by another substance. In Eppstein, the reservoir volume is fixed and is not forcibly displaced by another substance. Thus, Eppstein does not teach either structure or function for positively displacing a release formulation from a reservoir.

The Examiner incorrectly construes Appellants' claim 19 element "a means for rupturing the rupturable covering and positively displacing the release formulation" to be two separate means. First, the means for rupturing and positively displacing recited in Appellants' claims is described in the specification, e.g., at page 16, line 10-14; page 17, lines 12-17; page 18, line 16 to page 20, line 7; page 22, line 5 to page 23, line 12; and in FIGS. 7, 10, 11, and 12. No explicit definition is required. Second, Appellants' specification describes certain embodiment in which the rupturing and displacement functions are *inextricably linked together.* For example, the

expansion of the expansion material or shape changing of the SMA microtube may cause the release formulation to be positively displaced from the microtube and necessarily cause the rupturable covering to be ruptured. See, e.g., page 19, lines 16-18 ("In another embodiment, release of reservoir contents from the microtube is controlled by changing the shape of the microtube rather than by expanding a material inside the reservoir of the microtube."); and page 17, lines 19-21 (describing that rupture of the rupturable covering is, in one embodiment, "due to expansion of the expansion material."). It is therefore clear that Appellants' claim 19 should not be read to require "two separate means."

The Examiner erroneously argues that "*any* structure which performs that same function is an equivalent." This is not the proper legal standard under 35 U.S.C. § 112, ¶ 6, which states that an element in a claim expressed as a means for performing a specified function "shall be construed to cover the corresponding structure, material, or acts *described in the specification or equivalents thereof.*" Factors sufficient to support a legal determination of equivalence include: (a) whether the prior art element performs the identical function specified in the claim in substantially the same way; (b) whether a person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding element disclosed in the specification; (c) whether there are insubstantial differences between the prior art element and the corresponding element disclosed in the specification; and (d) whether the prior art element is a structural equivalent of the corresponding element disclosed in the specification. M.P.E.P. § 2184 [II]. With respect to factor (a), Eppstein's pressure modulation system does not perform the "positively displacing" function specified in Appellants' claims, and does not function in the same way. As to factor (b), a person of ordinary

skill would have recognized that Eppstein's pressure modulation system is not interchangeable with Appellants' claimed means, since the pressure modulation system only can be used in close proximity to a biological membrane. As to factors (c) and (d), there are substantial differences, both structural and functional, between a pressure modulation system and Appellants' claimed means which, in some embodiments, includes a fluid or heat swellable material. For example, the structure and function of Eppstein's device provides and relies upon microporation of a biological membrane. In contrast, Appellants' claimed device does not require such functionality or structure.

For the foregoing reasons and the reasons of record, no *prima facie* case of anticipation has been established. Claims 14-18, 20-29, 35, 36, and 39 are novel over Eppstein.

C. Ground No. 2

The Examiner's comparison of the microneedles of Krulevitch to certain features of Appellants' claim 19 is unreasonable. The correspondence the Examiner conjures between the two structures defies logic.

First, Krulevitch discloses a system that delivers drug through microneedles 97 by pumping fluid from reservoirs 86-90, which are located in a substrate 80. Krulevitch teaches that the drug reservoir is both distinct from and remote from the microneedles. This system cannot reasonably be considered to be identical or equivalent to a "*microtube having a reservoir defined therein.*" It is irrelevant whether Appellants recite in claim 19 that the formulation is "wholly contained" within the reservoir. Krulevitch's microneedles can not be construed to have a reservoir in them. Krulevitch's reservoirs can not be construed to be part of the microneedles.

In sum, the reference cannot properly be said to be identical or equivalent to the microtube devices of Appellants' claim 19.

Second, Krulevitch discloses that the fluid to be delivered is to be *sealed* within the substrate. This **teaches away** from disposing any amount of drug within the microneedles. Krulevitch teaches that "channel sealing is dependent on selective poly (dimethylsiloxane) (PDMS) surface modifications," and that "[t]he polymer channel should be hydrophobic and pneumatic fluid should be hydrophilic when using hydrophilic reagents or vice versa... for [a] leak proof seal." (Col. 6, Lns. 56-60). Therefore the fluid would not be in the microneedle except during use. The transient passage of drug formulation through the microneedle during use would not reasonably be considered identical or equivalent to a microtube-based reservoir in which the release formulation is "disposed." One of ordinary skill in the art therefore would not consider Krulevitch to disclose or teach Appellants' claim 19 which requires "an array of discrete microtubes, each microtube comprising a reservoir defined therein; ... the release formulation being disposed in each reservoir."

Finally, the reasons invented by the Examiner for why one of ordinary skill in the art allegedly would combine the "covering of Santini with the microneedles of Krulevitch" are factually unsupported and legally insufficient to establish a *prima facie* case of obviousness. First, the Examiner provides no evidence of design need or market pressure. Teleflex, Inc. v. KSR Int'l Co., 550 U.S. __, 127 S. Ct. 1727, 1742 (2007). There is no evidence that Krulevitch needed to prevent contamination. There is no evidence that combining the "covering of Santini" would either prevent contamination or allow a wider range of drugs to be delivered with the

Krulevitch device. The Examiner's reasons are sheer conjecture. Second, even if one skilled in the art were so inclined to try to make modifications to the Krulevitch device in order to improve its ability to exclude contaminants or to increase the range of drugs deliverable with the device, there nevertheless would have been a *numerous different* of ways in which that could have been accomplished. One of ordinary skill in the art might have considered or tried many other approaches to achieve such results. But that is not the legal standard.

The Supreme Court declared that a combination of elements may be obvious to try only "when there is a design need or market pressure to solve a problem **and there are a finite number of *identified, predictable solutions*** [and] a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp." Teleflex, Inc. v. KSR Int'l Co., 550 U.S. __, 127 S. Ct. 1727, 1742 (2007). Here, one of ordinary skill in the art trying to enhance sterility or increase the variety of drugs suitable for use with the Krulevitch device has a nearly infinite variety of technical options to choose from in trying to meet such objectives. For instance, instead of a rupturable cover, one could have selected a mechanical or electromechanical valve or gate, or one could have tried various coatings to change the hydrophilicity or hydrophobicity of fluid-contacting surfaces in the Krulevitch system in order to expand its compatibility with different drugs. These are just a few of the myriad options one of ordinary skill in the art might have selected. Accordingly and unlike in Teleflex, where there were essentially only two possible positional options from which to choose, here one of ordinary skill would not have had a particular reason to select the reservoir cap disintegration technology of Santini, absent improper hindsight reconstruction based on Appellants' disclosure. It therefore would have required more than mere common sense and more than a mere simple

substitution for the artisan of ordinary skill to leap from the prior art teachings of Krulevitch, alone or in combination with Santini, to derive Appellants' devices.

A proper *prima facie* case of obviousness has not been established. Claims 19 and 42-47 are non-obvious over Krulevitch in view of Santini.

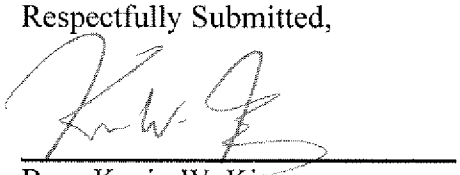
D. Ground No. 3

The Examiner's allegation that "one of ordinary skill in the art would recognize that [Theeuwes] osmotic pump is easily substituted for [Eppstein's] "small pump" is factually unsupported and legally insufficient to establish a *prima facie* case of obviousness of Appellants' claim 40. Whether an osmotic pump requires electronics or has "simpler" design is immaterial, because one of skill in the art understands that the two types of pumps are not readily interchangeable in the devices and applications of Theeuwes and Eppstein. First, Eppstein teaches using a pump "such as a small diaphragm or peristaltic pump" (Col. 29, Lns. 50-51). These types of pumps clearly do not operate using any kind of osmotic system. Furthermore, diaphragm and peristaltic pumps are reciprocating pumps; an osmotic is not. Second, Eppstein is intended for use outside the patient, to porate the skin. In contrast, Theeuwes is an oral or ocular implant system. One of ordinary skill in the art would not be motivated to swap pumps, because the osmotic system of Theeuwes must imbibe fluid from its *in vivo* surroundings in order to work, whereas the Eppstein device could not readily operate to both take fluids in through the pores made and simultaneously deliver drug from a reservoir through those pores. Lastly, it is not predictable that one could achieve with the Theeuwes osmotic system the same control of release kinetics obtainable with the actuation means of Eppstein's device.

The Examiner has not provided any sound technical reasoning why one of ordinary skill in the art would combine Theeuwes with Eppstein in a fashion to derive Appellants' claims. Accordingly, no *prima facie* case of obviousness has been established for claims 40 and 41.

In conclusion, the cited prior art, as a whole, fails to teach the claimed combination of elements defining Appellants' claimed devices and methods. No *prima facie* case of novelty or obviousness has been established based on the references of record, alone or in combination. Appellants respectfully request that the Board reverse the Examiner and order the allowance of all claims.

Respectfully Submitted,



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